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The Imagination of Science

Less than one per cent of the students who complete 10+2 school years go on to Science education at college level. While the total number of students in all three years of undergraduate sciences courses has risen from 1.28 lakh students in 1950 to 7.25 lakh in the late eighties, the percentage of total student population choosing science education has dropped from 32 per cent to less than 19 per cent today. Hence the total university output of undergraduates each year is less than one-third. The trend has sent alarm bells in the scientific community and in academic circles who fear that research in space sciences and related fields may collapse, if students do not opt for pure science at the under-graduate level. Director of National Institute of Advanced Studies (NIAS) and member of the Indian Academy of Sciences ***Roddam Narasimha*** *was instrumental in preparing a report on the decline in student enrolment in science spoke to* ***Seethalakshmi S.*** *on the trend and its implications.*

What do you think is ailing science education in our country?

We are in a situation where the system makes decisions for students. The B.Sc course, for instance, has failed because it is over-regulated and standardised so much so that a student has no say in his subject of study. You have a set of options and the student has to select his subject of study from that. The maximum damage to our students occurs at the under-graduate level. Practically nowhere can a student hope to pursue combinations like biology and physics at the undergraduate level. One still has to choose from the old-fashioned combination. It is a 'rationcard mentality'. This absurd inflexibility must go, if we have to promote science. The onus of selecting the course should be on the student. Yet another major factor that has contributed to this sorry state of affairs is the outdated and boring syllabus. This also kills the enthusiasm in the student to pursue pure science research. We have never tailored the courses to our needs. To top it, vast majority of our schools are ill-equipped to impart science education.

Why hasn't anything been done to make courses relevant and the syllabi up to date? Isn't it time scientists and educationists thought seriously about these issues and persuade the government and the authorities concerned to act?

Yes. The time has come for the scientific community to take serious stock of the situation. It is with this in mind that the Indian Academy of Sciences prepared a report on the status of university science education in 1994. The panel comprising scientists made several recommendations including restructuring the B.Sc course. In fact, we had made two sets of recommendations, one for the major agencies and government departments and the other for the science academy to take initiatives on its own. One of our main recommendations was to restructure the present B.Sc course which is a 'mixed bag' now. All undergraduate students should take common courses in physics, chemistry, mathematics and biology in the first two years or select combinations from a core curriculum, so that the fundamentals are clearly learnt. In the third year, we should leave it to the student to select the area of specialisation. In sum, the B.Sc degree course should be split into three to cater to different kinds of students - those who want to make pure science research as their career, those who are looking at job opportunities and those students who do the B.Sc course to pursue other occupations. Major decisions like revision of curriculum should be done by the respective universities and the government. The academy can only recommend, we cannot take decisions.

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Where do you think have we failed?

On many fronts. There has been no assessment of the country's needs for talented scientists in different spheres. The National Science Talent search awards scheme instituted in 1964 was a worthwhile attempt to attract the best and highly motivated students to devote themselves to careers in science. Unfortunately, the necessary follow-up to retain such students did not take place though the scheme was enlarged. Only 10 per cent of the total awardees were opting for Science. There is no doubt that the maximum damage occurs at the under-graduate level. The government's policy of establishing chains of research institutions and nationalised laboratories outside the purview of the university system, without proper healthy linkages to the latter has also contributed to diminishing standards.

Isn't it true that pursuing science or going into research is not lucrative?

There is no doubt that unless there are employment opportunities, no student will take up science. It is for this that we have to restructure the courses so that applied science is a major component of the curriculum. Major research laboratories and science departments like ISRO, department of atomic energy must institute scholarships and support M.Sc courses. This will go a long way in attracting students. Once the students are assured of support from these agencies, it will not be a problem to persuade them to take up research.

How has the Indian Academy of Sciences been able to stem the rot?

We have begun by creating a network of teachers who play a major role in making science attractive to students. *The Resonance* is a monthly journal brought out by the academy where students, scientists and teachers write. We have started in a humble way because we are under no illusion that things will change overnight. We have instituted fellowships for students and teachers. Forty students and 10 teachers take up research work at the academy every year. Besides one fellow from the academy goes to colleges to deliver lectures. The academy is also donates books, journals and equipments to colleges and laboratories. Absence of good science books to our students is another issue that is to be tackled. The academy is in the process of preparing educational monographs on science. These are not textbooks, they are meant to stimulate students and teachers.

How are these worrying trends going to affect research in space sciences and atomic energy?

I must admit that we are already late in preventing a disaster. What will happen to our research laboratories if no student wants to take up even under-graduate courses in the sciences? We ought to be starting right away, if we have to see people doing research in our laboratories five or ten years from now. Otherwise our initiatives in space sciences and atomic energy will collapse. The percentage of people to sustain the research work done now, will be very small. Yes, the alarm bells are already ringing and it is high time we reacted.